



# Mortality and Morbidity in Elective Patient of Coronary Artery Bypass Graph at National Cardiovascular Center, Harapan Kita Hospital, Indonesia

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## Abstract

This study is aimed to find out mortality and morbidity in the elective patients while waiting and description of waiting time in elective patients at The Department of cardiovascular surgery, Harapan Kita Hospital. This study research was using quantitative and qualitative design study. The quantitative data collected prospectively within two months from August until September 2010. From 58 patients, one patient died while waiting and one patient falls into stroke. There's no adequate system in scheduling patient, including put the patient into the list of que, decide the urgency and remove the patients from the list. It's known that morbidity and mortality are not found as a significant event happened while waiting for CABG in this study. It's difficult to ignore the two patients, especially after knowing there's no adequate system to decide wait time and schedule at The Department of cardiovascular surgery, Harapan Kita Hospital, while resources are still quite enough (facility and human resources) to accommodate all the cases.

**Keywords:** waiting time, scheduling, mortality, morbidity

## 1. Introduction

### 1.1 Introduce the Problem

Cardiovascular disease still becomes the leading cause of mortality globally. It was estimated that approximately 17.5 million people worldwide die because of cardiovascular disease in 2012, which is about 31% of 51,5 million people (World Health Organization Regional Office for South-East Asia and the Pacific, 2017). It was also estimated in 2030, about 23,6 million people will die because of cardiovascular disease, mainly because of heart disease and stroke. The highest percentage of cardiovascular disease will be in East Mediterania, while increasing mortality will occur in Southeast Asia (WHO, 2009). Indonesia, as one of the countries in Southeast Asia, should aware of this global issue. System Registration Sample Survey (SRS) in 2014 showed Coronary Heart Disease as the leading cause of all mortality in all ages after stroke. Riskesdas (Basic Health Research in Indonesia) in 2013 mentions that 3 (three) highest diseases that lead to death are heart disease, cancer, and stroke (Kementarian Kesehatan RI, 2017).

Coronary Artery Bypass Graph (CABG) is one of the most frequent surgical procedures worldwide (Rexius et al., 2006a). Despite a large number of surgical procedures, there is an imbalance between needs and resource to full this procedure which leads to waiting time of surgical (Lau et al., 2007), giving priority within patients (Bono et al., 1998), and mortality within the patient while waiting list. (Koomen, 2001). These phenomena not only happened in Indonesia but also around the world. A list of long waiting times for CABG already reported from all over the world, such as in Sweden, Canada, New Zealand, Great Britain, and Netherland (Rexius et al., 2006a).

Waiting time was identified relates to several disadvantages such as morbidity, risk factor, life quality, anxiety, and also stress in patients. Patient Morbidity in waiting time usually relates to revascularization delays such as stroke, myocardial infarction, and angina pectoris attack. Delay in revascularization in patient CABG with ischemic left ventricular dysfunction showing the decrease of heart function and the possibility of

contractility repair (Rexius et al., 2005). Moreover, waiting time is an independent factor for mortality risk impatient while waiting. A study shows, extensive waiting periods for CABG contribute to higher mortality and morbidity rates, especially in patients with left ventricular dysfunction (da Fonseca, De Lorenzo, Tura, Pittella, & da Rocha, 2018). Perioperative mortality could be hindered by shortening waiting time. However, a study conducted by Ray and colleagues (Ray, Buth, Sullivan, Johnstone, & Hirsch, 2001) (Ray et al., 2017) shows that death and upgrades while the patients were waiting tended to occur early in the queuing process, and prolonged waiting, was not associated with worse surgical outcomes.

Based on the annual report released by National Cardiovascular Center Harapan Kita Hospital, the number of cases of surgical procedure in 2008 generally almost reach 1.821 cases. Furthermore, the number increase in 2009 become 1.904 cases. Specifically, there is an increase in coronary case number from 660 cases in 2008 become 750 cases in 2009. This increase is a trend that will continually happen in the future in line with the change of lifestyle and disease pattern in Indonesia society. The increase of case number is not accompanied by the increase of supporting resources number, so imbalance comparison between needs and fulfillment leads to waiting time before the operation. Nowadays, there are three operation theaters for adult surgical and two operation theaters for child procedure to handle all the cases in the National Cardiovascular Center Harapan Kita Hospital. Relate to the human resource; there are nine thoracic and cardiovascular surgeons (6 specialists in adult and 3 specialists in the child). Meanwhile, there is still no data about waiting time, such as a mean for waiting for time and mortality and morbidity while waiting.

The purpose of this study was to find out mortality and morbidity in elective patient while waiting and description of waiting time in elective patient related to resources needed (system, human resources and facility) at department of cardiovascular surgery, National Cardiovascular Center Harapan Kita Hospital as the only one referral center for cardiovascular case in Indonesia.

## 2. Method

### 2.1 Research Study

This study was conducted at Department of cardiovascular surgery, National Cardiovascular Center Harapan Kita Hospital, as the referral center for cardiovascular case in Indonesia. The aim of this study was to find out the mortality and morbidity of the elective patients while waiting for Coronary Artery Bypass Graph (CABG) procedure. The study using both quantitative and qualitative studies.

The population in this study was all the patients at a department of cardiovascular surgery, National Cardiovascular Center Harapan Kita Hospital, who diagnosed with coronary heart dysfunction. These patients then consulted with Thoracic and Cardiovascular Surgery to have Coronary Artery Bypass Graph (CABG) procedure only without any other procedure in the National Cardiovascular Center Harapan Kita Hospital. The sample of this study was all the elective patients during August-September 2010 who fulfilled inclusion and exclusion criteria. Inclusion criteria were all patients with coronary heart disease without any hemodynamic instability and out of emergency category patient (emergency) to operated. Exclusion criteria were patients with coronary heart disease who need emergency CABG plus other heart surgical procedures. This study was conducted in the National Cardiovascular Center Harapan Kita Hospital, specifically in the department of adult cardiovascular surgery and central ward, 2nd floor, Building 1 from August until November 2010. Treatment The data collected in this study was secondary. There were several sources, such as the book of schedule, registration book, nursing notes, and medical record. Qualitative data collection was done by depth interview, observation of scheduling activity, and documentation review. The period of data collection was from August until November 2010. All this activity was done in the department of cardiovascular surgery and intermediate ward. The instrument which was used in the qualitative design is the patient observation checklist, which self-fulfilled by a researcher. Meanwhile, the instrument used in-depth interview is a list of questions base on the topic discussed and checklist for observation.

There are two types of data analysis for this study depend on the kind of data. Quantitative data were analyzed by univariate analysis to find out the description of distribution frequency (numeric variable) and description of descriptive, which is a proportion (categorical variable). In addition, qualitative data were analyzed manually by writing the result of the study into the transcript of depth interview results then summarized into a matrix. The matrix will be written in a formal language based on the statement of the informant. This summary then transformed into the narration and resumed into a description, which already received generally.

### 3. Result

#### a. The General condition of patients

In the beginning, there were about 85 patients included in the inclusion criteria. Nevertheless, then in progress, there were 27 patients canceled and only 58 patients who finally planned to standard CABG procedure. The average patient's age was 57.8, with a deviation standard of 7.7. The youngest patients were 40 years old, while the oldest was 78 years old

Table 1. Characteristic of Patient (Sex and Body Mass Index)

VARIABEL	Frek n (n=58)	%
<b>Sex</b>		
Male	55	94,8
Female	3	5,2
<b>Body Mass Index</b>		
Underweight	2	3,4
Normal	33	56,9
Overweight	15	25,9
Obesities	8	13,8

In this study, the data collected only about the patient's general condition, which influences the waiting time. The result is shown in table 2 that the average blood vessel dysfunction in patient is 2.9 with deviation standard 0.4. Average of left ventricle dysfunction, known as Ejection Fraction (EF), is 54 with deviation standard 13.5. From all the total patient (n=58), only about 1,7% (n=1) patient with renal failure. There are about 3,4% (n=2) patients with cerebrovascular disease. Patient with diabetes mellitus risk factor was about 31% (n=18). All patients in this study received CABG surgical procedure for the first time. About 8,6% (n=5) patients who receive this procedure already through PCI (Percutaneous Coronary Intervention) previously. There was 74,1% (n=43) patient with angina pectoris. Moreover, based on the type, there was 86,4 % (n=37) with stable and the rest 13,6% (n=6) was unstable. About 24,1% (n=14) patient was in left main dysfunction and about 1,7% (n=1) patient was had stroke before the procedure.

Table 2. General Description of Patient's Clinical Condition

VARIABEL	Total (n = 58)	
	N	%
Renal Failure	1	1,7
PPOK	0	0
Cerebrovaskular Disase	2	3,4
Diabetes Melitus	18	31
Aorta Stenosis	0	0
Mitral Stenosis	0	0
Trikuspid Stenosis	0	0
Pulmonal Stenosis	0	0
Aorta Insufficiency	0	0
Mitral Insufficiency		
Trivial	6	10,3
Mild	3	5,2
Moderate	1	1,7
Trikuspid Insufficiency		
Trivial	4	6,9
Mild	2	3,4
Pulmonal Insufficiency	0	0
Risk		
Low	44	75,9
Medium	14	24,1

First CABG Procedure	58	100
PCI history	5	8,6
Pacemaker history	1	1,7
Angina Pectoris	43	74,1
Stable	37	86,4
Unstable	6	13,6
Left Main	14	24,1
Stroke Preop	1	1,7
Infark Miokard Preop	0	0

#### *a. Waiting time*

As mentioned previously, there were 85 patients included in the inclusion criteria. Moreover, about 27 patients was canceled because of several reasons such as: 1 patient had stroke, patient's clinical condition getting worst so he has to be rescheduled, patients need other procedure (such as PTCA or PCI), patients didn't ready to receive the procedure so they didn't show up at the day of procedure and move to another hospital. The Median of waiting time was 14 days. The fastest waiting time was five days and the longest was 41 days. Base on the depth interview, clinically waiting time was influenced by emergencies of a patient and also their general condition. Furthermore, almost all informants in management said that waiting time was influenced by the number of patients register, the complexity of case, numbers of surgeons available, numbers of operating theater, numbers of beds in ICU and numbers of the ward. The informant also said that priority is already given for patients who will receive the surgical procedures. Patients with priority, mainly because of their clinical condition and also because they had come from out of the city. Unfortunately, there still no Standard Operational Procedure (SOP) which regulates waiting time.

There were several reasons to determine whether the procedure needs to be urgent(cito)orelective. They are the general condition of the patient when they come to the hospital (acute and have a particular case), the period from the first-time attack until the surgical procedure (stable or unstable). Moreover, there is already SOP to regulate the emergency surgical procedure (urgent). However, in that document, there is no specific condition to mention whether a patient needs urgent surgical or not; it was only in general that mentioned urgent procedure needed if the condition life threatened. All informants said that waiting time was determined by the head of functional service, department of cardiovascular, while administrative staff assist him in receiving the consultation then giving schedule base on que and the schedule available. The study shows there still no optimal standard of waiting time used in the National Cardiovascular Center, Harapan Kita Hospital. Base on The Canadian Cardiovascular Society, the ideal of waiting time is 14 days. Base on it, researchers classify waiting time in this hospital into two categories, ideal waiting time and unideal. From 57 patients, about 50,9 % (n=29) patient receives surgical procedure within 14 days (ideal) while the rest 28 peoples (49,1%) receive the procedure for more than 14 days. Base on qualitative data, almost all informants said that there was already evaluation to determine waiting time. Half of the informants feel optimistic that base on the result of the evaluation, management of hospitals would add more resources in the operating theater, so queuing and waiting time can be decreased. Recently, based on more than half of informants, there was a plan to add one more adult theater and bed in ICU. Meanwhile, some informants said even evaluation was received. Still, no solution has taken yet. There is still a problem coming when the urgent patient needs to operate while the schedule was full of elective patients. It was hard sometimes to do the urgent procedure or finally sacrifice elective patients on that day.

## **4. Discussion**

### *a. Description of Characteristic and Clinical Condition of Respondent*

Base on analyzing of respondent characteristics, a patient who receive CABG procedure, tend to be younger compared to previous years. In the latest study, the average age of the patient was above 60 y.o, 66 y.o (Rexius et al., 2006b), or 64 y.o (Koomen, 2001). The fact that number of male patients bigger don't suit the fact that incidence of cardiovascular study was balanced between male and female (WHO, 2009), however, this study was consistent with Morgan and college who was studied more than 29.000 patient in wait time and find out that age, gender and left ventricle dysfunction was independent risk for mortality (Rexius et al., 2006a). The result that more patients had normal BMI doesn't support other studies that overweight is an indicator of hyperlipidemia and risk factor for coronary heart disease (Jackson et al., 1999).

The study shows that the average number of a dysfunction blood vessel inpatient was 2.9 or almost 3, which was a maximal number in criteria of blood vessel dysfunction. An average number of Ejection Fraction (EF) was 54%. A classification, which was done by another study, shows that EF scores  $\geq 50\%$  got scoring 0 as a predictor for giving priority to CABG procedure, while EF scores  $\leq 35\%$  was the highest-scoring to receive surgical procedure (Jackson et al., 1999).

There were about 73,1% (n=43) patients with angina pectoris. Furthermore, based on type there was 86,4 % (n=37) with stable condition and the rest was 13,6% (n=6) in unstable condition. According to the distribution in waiting time, patients with stable angina pectoris more likely had not ideal waiting time, which is about 95,2% (n=20), and patients with unstable angina pectoris more likely had ideal waiting time. The previous study conducted by Naylor and college (Naylor et al., 2000) identified three main determinants to influence the urgency of giving CABG procedure, they are severity, angina symptom, the anatomy of the coronary and invasive test result for angina. There was 24,1% (n=14) patient had left main dysfunction and about 1,7% (n=1) patient got stroke once before the surgical procedure. Based on the availability of left main dysfunction inpatient while waiting, the patient left the main dysfunction more likely in a position of ideal waiting time (31%, n=9). This fact is not consistent with the previously studied, which gives higher urgency to the patient with left main dysfunction. The latest study shows that patient with left main dysfunction (main left branch) and worst left ventricle function leads to a bigger risk factor to mortality, especially during the surgical procedure because it was the most important predictor to know survival rate (Jackson et al., 1999). Based on risk factors related to mortality and morbidity in waiting time, these patients should be in elective surgical and not in the urgent procedure.

#### b. Wait Time

The result of this study shows that wait time in the National Cardiovascular Center, Harapan Kita hospital faster compared with wait time in the previous studies such as in Australia and Europe. Four other mortality has happened after the operation while the patient still in hospitalization. The reasons for those patients are 75% (n=3) because of clinical problems related to a heart condition and 25% (n=1) because of infection after operated. Even though this study didn't conduct further bivariate analysis to find out relationship between wait time and mortality and morbidity, and also other study shows that wait time is not predictive independent for the increase of mortality (Legare et al., 2005), in fact it's hard to ignore the fact that there is 1 patient out of 57 who died and 1 patient out of 57 who had complication while waiting for CABG procedure.

#### Acknowledgments

The short period to conduct this study lead to a limited number of the sample, which could be studied and also the phenomena of mortality and morbidity in patients. This study uses longitudinal design during 2 (two) months studied so that the result could not be generalized as what tends to have happened in the Department of Cardiovascular, National Cardiovascular Center, Harapan Kita Hospital, especially which related to mortality and morbidity. Furthermore, there was no exploration of race, socio-economy condition, and alternative medication, which also suspected as one of the reasons schedule change and waiting time.

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